

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

THE TRUSTEES OF COLUMBIA)
UNIVERSITY IN THE CITY OF NEW)
YORK and INTELLIGENT BIO-SYSTEMS,)
INC.,)
Plaintiffs-Counterclaim Defendants,)
and QIAGEN NV,)
Counterclaim Defendant,) C.A. No. 12-376-GMS
v.)
ILLUMINA, INC.,)
Defendant-Counterclaim Plaintiff,)
and ILLUMINA CAMBRIDGE LTD.,)
Counterclaim Plaintiff.)

**DEFENDANT ILLUMINA, INC.'S AMENDED ANSWER AND
COUNTERCLAIMS TO PLAINTIFFS' AMENDED COMPLAINT**

Pursuant to Fed. R. Civ. P. 15(a)(2), Defendant Illumina, Inc. ("Illumina") hereby amends its answers and counterclaims to the Amended Complaint of Plaintiffs The Trustees of Columbia University in the City of New York and Intelligent Bio-Systems ("Plaintiffs") as follows:

THE PARTIES

1. Columbia University is one of the world's leading institutions of higher education, located at 535 West 116th Street, New York, New York 10027. It is a non-profit educational corporation formed by special act of the Legislature of the State of New York.

ANSWER: Upon information and belief, Illumina admits that Columbia University is an institution of higher education, located at 535 West 116th Street, New York, New

York, 10027. Illumina is without sufficient knowledge to admit or deny the remaining allegations of this paragraph, and on that basis denies them.

2. IBS is a Delaware corporation having its principal place of business at 34 Bear Hill Road, Waltham, Massachusetts 02451.

ANSWER: Upon information and belief, Illumina admits.

3. Upon information and belief, Illumina is a Delaware corporation having its principal place of business at 5200 Research Place, San Diego, California 92122.

ANSWER: Admits.

JURISDICTION AND VENUE

4. This action arises under the patent laws of the United States of America, 35 U.S.C. §§ 1 *et seq.*

ANSWER: Illumina admits that the Complaint purports to state an action arising under the patent laws of the United States of America, 35 U.S.C. §§ 1 *et seq.*, but denies that the Complaint states any claim upon which relief may be granted.

5. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

ANSWER: Admits.

6. This Court has personal jurisdiction over Illumina because Illumina is incorporated in the State of Delaware, and has purposely availed itself of the privilege of conducting activities within this district. Illumina is also subject to general personal jurisdiction in this district because, upon information and belief, Illumina regularly and systematically conducts business in Delaware, including, *inter alia*, through its ongoing sales of products and services to customers located in the State of Delaware. Upon information and belief, Illumina has been a defendant in other actions in this district and has not contested personal jurisdiction.

ANSWER: Illumina admits that this Court has personal jurisdiction over Illumina. Illumina admits that it is subject to general personal jurisdiction in this district. Illumina admits that it has sold products and services to at least one customer in the State of

Delaware. Illumina admits that it has been a defendant in other actions in this district and has not contested personal jurisdiction. Illumina denies the remaining allegations of this paragraph.

7. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b) and (c), and 28 U.S.C. § 1400(b).

ANSWER: Illumina admits that venue is proper in this district. Illumina denies that venue in this district is the most convenient for the parties and witnesses or serves the interests of justice in this action.

CLAIM FOR RELIEF - PATENT INFRINGEMENT

8. United States Patent No. 7,635,578 ("the '578 Patent") (attached as Exhibit A), titled "Massive Parallel Method for Decoding DNA and RNA", issued on December 22, 2009, in the name of inventors Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

ANSWER: Illumina admits that Plaintiffs attached what appears to be a copy of the '578 Patent to the Complaint as Exhibit A. Illumina admits that, on its face, Exhibit A states that the '578 Patent is titled "Massive Parallel Method for Decoding DNA and RNA," and shows an issue date of December 22, 2009. Illumina admits that, on its face, the '578 Patent states that it issued in the names of Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

9. United States Patent No. 7,713,698 ("the '698 Patent") (attached as Exhibit B), titled "Massive Parallel Method for Decoding DNA and RNA", issued on May 11, 2010, in the name of inventors Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

ANSWER: Illumina admits that Plaintiffs attached what appears to be a copy of the '698 Patent to the Complaint as Exhibit B. Illumina admits that, on its face, Exhibit B states that the '698 Patent is titled "Massive Parallel Method for Decoding DNA and RNA," and shows an issue date of May 11, 2010. Illumina admits that, on its face, the

'698 Patent states that it issued in the names of Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

10. United States Patent No. 7,790,869 ("the '0869 Patent") (attached as Exhibit C), titled "Massive Parallel Method for Decoding DNA and RNA", issued on September 7, 2010, in the name of inventors Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

ANSWER: Illumina admits that Plaintiffs attached what appears to be a copy of the '0869 Patent to the Complaint as Exhibit C. Illumina admits that, on its face, Exhibit C states that the '0869 Patent is titled "Massive Parallel Method for Decoding DNA and RNA," and shows an issue date of September 7, 2010. Illumina admits that, on its face, the '0869 Patent states that it issued in the names of Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

11. United States Patent No. 7,883,869 ("the '3869 Patent") (attached as Exhibit D), titled "Four-Color DNA Sequencing by Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators", issued on February 8, 2011, in the name of inventors Jingyue Ju, Dae Hyun Kim, Lanrong Bi, Qinglin Meng, and Xiaoxu Li.

ANSWER: Illumina admits that Plaintiffs attached what appears to be a copy of the '3869 Patent to the Complaint as Exhibit D. Illumina admits that, on its face, Exhibit D states that the '3869 Patent is titled "Four-Color DNA Sequencing by Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators," and shows an issue date of February 8, 2011. Illumina admits that, on its face, the '3869 Patent states that it issued in the names of Jingyue Ju, Dae Hyun Kim, Lanrong Bi, Qinglin Meng, and Xiaoxu Li.

12. United States Patent No. 8,088,575 ("the '575 Patent") (attached as Exhibit E), titled "Massive Parallel Method for Decoding DNA and RNA", issued on January 3, 2012, in the name of inventors Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki .

ANSWER: Illumina admits that Plaintiffs attached what appears to be a copy of the '575 Patent to the Complaint as Exhibit E. Illumina admits that, on its face, Exhibit E

states that the '575 Patent is titled "Massive Parallel Method for Decoding DNA and RNA," and shows an issue date of January 3, 2012. Illumina admits that, on its face, the '575 Patent states that it issued in the names of Jingyue Ju, Zengmin Li, John Robert Edwards, and Yasuhiro Itagaki.

13. Hereinafter, the '578 Patent, '698 Patent, '0869 Patent, '3869 Patent, and '575 Patent are referred to collectively as "the Ju Patents."

ANSWER: No answer is required for this paragraph.

14. Columbia University is the assignee of all right, title, and interest in and to the Ju Patents. IBS is the exclusive licensee of the Ju Patents.

ANSWER: Illumina is without sufficient knowledge to admit or deny the allegations in this paragraph, and on that basis denies them.

15. The Ju Patents cover next-generation sequencing ("NGS") technologies that allow the rapid and precise sequencing of DNA. In particular, the Ju Patents disclose and claim a type of NGS technology called "sequencing by synthesis." NGS technologies are used in a variety of medical and research applications, including identifying genes and polymorphisms associated with disease and with individual variability in drug response, and are important to ongoing genomics research and discovery, particularly in the emerging field of personalized medicine, which seeks to use a patient's own genomic DNA sequence information as the basis for individualized healthcare.

ANSWER: Illumina is without sufficient knowledge to admit or deny the allegations in this paragraph, and on that basis denies them.

16. Upon information and belief, Illumina has manufactured, used, offered for sale, sold and/or imported into the United States, and/or manufactures, uses, offers for sale, sells and/or imports into the United States, and/or will manufacture, use, offer for sale, sell and/or import into the United States, instruments ("NGS Instruments"), kits and reagents ("NGS Kits and Reagents"), and services ("NGS Services") (collectively, "NGS Products") that use the NGS technologies disclosed and claimed in the Ju Patents.

ANSWER: Denies.

17. Upon information and belief, Illumina has offered for sale and sold, and/or offers for sale and sells and/or will offer for sale and sell, its NGS Products, directly or indirectly, to various users, including, but not limited to, the Illumina Certified Service Providers and Illumina Core Labs (collectively, "Illumina's Customers") listed on Illumina's website (see Exhibit F hereto), and other genome centers, academic and individual researchers, corporations and clinical laboratories, who have used, use and/or will use the NGS Products to perform DNA sequencing.

ANSWER: Illumina admits that it has offered for sale and sold, and/or offers for sale and sells and/or will offer for sale and sell sequencing products to various users, including members of Illumina's Certified Service Providers program, members of Illumina's Core Labs program, other genome centers, researchers, corporations and clinical laboratories. Illumina denies that those sequencing products infringe any of the Ju Patents, and denies the remaining allegations contained in this paragraph.

18. Upon information and belief, Illumina has included, includes and/or will include with its NGS Products, instructions for their use in performing DNA sequencing.

ANSWER: Illumina admits that it has included, includes and/or will include instructions to users of some of its sequencing products. Illumina denies the remaining allegations in this paragraph.

19. Illumina's NGS Instruments include, but are not limited to, the HiSeq 2500/1500, HiSeq 2000/1000, Genome Analyzer IIx, MiSeq Personal Sequencer, and HiScanSQ products.

ANSWER: Illumina admits that the HiSeq 2500/1500, HiSeq 2000/1000, Genome Analyzer IIx, MiSeq Personal Sequencer, and HiScanSQ are Illumina instruments. Illumina denies that such instruments use the NGS technologies disclosed and claimed in the Ju Patents.

20. Illumina's NGS Kits and Reagents include, but are not limited to, the TruSeq SBS Kit v3-HS, TruSeq SBS Kit v5-GA, and MiSeq Reagent Kit products.

ANSWER: Illumina admits that the TruSeq SBS Kit v3-HS, TruSeq SBS Kit v5-GA, and MiSeq Reagent Kit products are Illumina sequencing products. Illumina denies that such sequencing products use the NGS technologies disclosed and claimed in the Ju Patents.

21. Illumina's NGS Services include, but are not limited to, the Illumina Genome Network, Illumina Certified Service Provider (CSPro) Program, and the Individual Genome Sequencing (IGS) services.

ANSWER: Illumina admits that the Illumina Genome Network program is provided by Illumina in cooperation with additional non-Illumina entities. Illumina admits that the Individual Genome Sequencing (IGS) service is an Illumina service. Illumina denies that such services use the NGS technologies disclosed and claimed in the Ju Patents. Illumina denies that the Illumina Certified Service Provider (CSPro) Program is an Illumina service. Illumina denies the remaining allegations of this paragraph.

22. Upon information and belief, beginning in or about 2009 and continuing to date, Illumina became aware of the patent applications that matured into the Ju Patents and of the Ju Patents in connection with, inter alia, performing due diligence investigations of those applications and Patents in connection with discussions with IBS concerning the possibility of acquiring IBS; monitoring the prosecution of those applications; and providing prior art to IBS, which Columbia University thereafter submitted to the Patent Office during prosecution of those applications.

ANSWER: Illumina admits that it became aware of at least some of the patent applications that matured into the Ju Patents and of the Ju Patents in 2009, or on or about at the time of their issue. Illumina admits that it monitored at least some of the prosecution of at least some of those applications and gave three prior art references to IBS during the prosecution of U.S. App. Ser. No. 11/894,898. Illumina denies that those three prior art references were cited to the USPTO

during the prosecution of all of the Ju Patents. Illumina denies the remaining allegations of this paragraph.

23. Upon information and belief, Illumina had knowledge of the Ju Patents prior to commencing or continuing the commercialization of one or more of its NGS Products and/or has continued commercializing its NGS products after gaining knowledge of the Ju Patents.

ANSWER: Illumina admits that it became aware of the patent applications that matured into the Ju Patents in 2009. Illumina admits that it continues to commercialize its instruments, products, and services at the present. Illumina denies that its instruments, products, and services use the NGS technologies disclosed and claimed in the Ju Patents. Illumina is without sufficient knowledge to admit or deny the remaining allegations of this paragraph, and on that basis denies them.

COUNT 1
Infringement of U.S. Patent No. 7,635,578

24. Plaintiffs incorporate herein by reference the allegations set forth in paragraphs 1-23 above.

ANSWER: Illumina incorporates herein by reference paragraphs 1-23 of its Answer.

25. Illumina has infringed, is infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '578 Patent by manufacturing, using, offering for sale, selling and/or importing into the United States its NGS Products.

ANSWER: Denies.

26. Users of Illumina's NGS Products, including but not limited to Illumina's Customers, have infringed, are infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '578 Patent by using those products to perform DNA sequencing.

ANSWER: Denies.

27. Illumina has actively induced, is actively inducing and/or will actively induce, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '578 Patent, by offering for sale and selling its NGS Products and providing use instructions to users, including but not limited to Illumina's Customers, intending that those users use the NGS products in a manner that infringes one or more claims of the '578 Patent.

ANSWER: Denies.

28. Illumina has contributed to, is contributing to and/or will contribute to, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '578 Patent, by offering for sale and selling its NGS Products to users, including but not limited to Illumina's Customers, knowing that its NGS Products have been especially made or adapted for use in an infringing manner, as evidenced by the '578 Patent's written description and the NGS Products' instructions for use.

ANSWER: Denies.

29. Each of Illumina's NGS Products constitutes or includes one or more material parts of the claimed inventions of the Ju Patents, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

ANSWER: Denies.

30. Illumina's infringement of the '578 Patent has caused Plaintiffs damage.

ANSWER: Denies.

31. Upon information and belief, Illumina's infringement of the '578 Patent has been and will continue to be willful, justifying an award to Plaintiffs of increased damages under 35 U.S.C. § 284, and attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

ANSWER: Denies.

COUNT 2
Infringement of U.S. Patent No. 7,713,698

32. Plaintiffs incorporate herein by reference the allegations set forth in paragraphs 1-23 above.

ANSWER: Illumina incorporates herein by reference paragraphs 1-31 of its Answer.

33. Illumina has infringed, is infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '698 Patent by manufacturing, using, offering for sale, selling and/or importing into the United States its NGS Products.

ANSWER: Denies.

34. Users of Illumina's NGS Products, including but not limited to Illumina's Customers, have infringed, are infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '698 Patent by using those products to perform DNA sequencing.

ANSWER: Denies.

35. Illumina has actively induced, is actively inducing and/or will actively induce, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '698 Patent, by offering for sale and selling its NGS Products and providing use instructions to users, including but not limited to Illumina's Customers, intending that those users use the NGS Products in a manner that infringes one or more claims of the '698 Patent.

ANSWER: Denies.

36. Illumina has contributed to, is contributing to and/or will contribute to, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '698 Patent, by offering for sale and selling its NGS Products to users, including but not limited to Illumina's Customers, knowing that its NGS Products have been especially made or adapted for use in an infringing manner, as evidenced by the '698 Patent's written description and the NGS Products' instructions for use.

ANSWER: Denies.

37. Each of Illumina's NGS Products constitutes or includes one or more material parts of the claimed inventions of the Ju Patents, and it is not a staple article or commodity of commerce suitable for substantial noninfringing use.

ANSWER: Denies.

38. Illumina's infringement of the '698 Patent has caused Plaintiffs damage.

ANSWER: Denies.

39. Upon information and belief, Illumina's infringement of the '698 Patent has been and will continue to be willful, justifying an award to Plaintiffs of increased damages under 35 U.S.C. § 284, and attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

ANSWER: Denies.

COUNT 3
Infringement of U.S. Patent No. 7,790,869

40. Plaintiffs incorporate herein by reference the allegations set forth in paragraphs 1-23 above.

ANSWER: Illumina incorporates herein by reference paragraphs 1-39 of its Answer.

41. Illumina has infringed, is infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '0869 Patent by manufacturing, using, offering for sale, selling and/or importing into the United States its NGS Products.

ANSWER: Denies.

42. Users of Illumina's NGS Products, including but not limited to Illumina's Customers, have infringed, are infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '0869 Patent by using those products to perform DNA sequencing.

ANSWER: Denies.

43. Illumina has actively induced, is actively inducing and/or will actively induce, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '0869 Patent, by offering for sale and selling its NGS Products and providing use instructions to users, including but not limited to Illumina's Customers, intending that those users use the NGS Products in a manner that infringes one or more claims of the '0869 Patent.

ANSWER: Denies.

44. Illumina has contributed to, is contributing to and/or will contribute to, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '0869 Patent, by offering for sale and selling its NGS Products to users, including but not limited to Illumina's Customers, knowing that its NGS Products have been especially made or adapted for use in an infringing manner, as evidenced by the '0869 Patent's written description and the NGS Products' instructions for use.

ANSWER: Denies.

45. Each of Illumina's NGS Products constitutes or includes one or more material parts of the claimed inventions of the Ju Patents, and it is not a staple article or commodity of commerce suitable for substantial noninfringing use.

ANSWER: Denies.

46. Illumina's infringement of the '0869 Patent has caused Plaintiffs damage.

ANSWER: Denies.

47. Upon information and belief, Illumina's infringement of the '0869 Patent has been and will continue to be willful, justifying an award to Plaintiffs of increased damages under 35 U.S.C. § 284, and attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

ANSWER: Denies.

COUNT 4
Infringement of U.S. Patent No. 7,883,869

48. Plaintiff incorporates herein by reference the allegations set forth in paragraphs 1-23 above.

ANSWER: Illumina incorporates herein by reference paragraphs 1-47 of its

Answer.

49. Illumina has infringed, is infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '3869 Patent by manufacturing, using, offering for sale, selling and/or importing into the United States its NGS Products.

ANSWER: Denies.

50. Users of Illumina's NGS Products, including but not limited to Illumina's Customers, have infringed, are infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '3869 Patent by using those products to perform DNA sequencing.

ANSWER: Denies.

51. Illumina has actively induced, is actively inducing and/or will actively induce, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '3869 Patent, by offering for sale and selling its NGS Products and providing use instructions to users, including but not limited to Illumina's Customers, intending that those users use the NGS products in a manner that infringes one or more claims of the '3869 Patent.

ANSWER: Denies.

52. Illumina has contributed to, is contributing to and/or will contribute to, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '3869 Patent, by offering for sale and selling its NGS Products to users, including but not limited to Illumina's Customers, knowing that its NGS Products have been especially made or adapted for use in an infringing manner, as evidenced by the '3869 Patent's written description and the NGS Products' instructions for use.

ANSWER: Denies.

53. Each of Illumina's NGS Products constitutes or includes one or more material parts of the claimed inventions of the Ju Patents, and is a staple article or commodity of commerce suitable for substantial noninfringing use.

ANSWER: Denies.

54. Illumina's infringement of the '3869 Patent has caused Plaintiffs damage.

ANSWER: Denies.

55. Upon information and belief, Illumina's infringement of the '3869 Patent has been and will continue to be willful, justifying an award to Plaintiffs of increased damages under 35 U.S.C. § 284, and attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

ANSWER: Denies.

COUNT 5
Infringement of U.S. Patent No. 8,088,575

56. Plaintiffs incorporate herein by reference the allegations set forth in paragraphs 1-23 above.

ANSWER: Illumina incorporates herein by reference paragraphs 1-55 of its Answer.

57. Illumina has infringed, is infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '575 Patent by manufacturing, using, offering for sale, selling and/or importing into the United States its NGS Products.

ANSWER: Denies.

58. Users of Illumina's NGS Products, including but not limited to Illumina's Customers, have infringed, are infringing and/or will infringe, literally and/or under the doctrine of equivalents, one or more claims of the '575 Patent by using those products to perform DNA sequencing.

ANSWER: Denies.

59. Illumina has actively induced, is actively inducing and/or will actively induce, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '575 Patent, by offering for sale and selling its NGS Products and providing use instructions to users, including but not limited to Illumina's Customers, intending that those users use the NGS products in a manner that infringes one or more claims of the '575 Patent.

ANSWER: Denies.

60. Illumina has contributed to, is contributing to and/or will contribute to, infringement, literally and/or under the doctrine of equivalents, of one or more claims of the '575 Patent, by offering for sale and selling its NGS Products to users, including but not limited to Illumina's Customers, knowing that its NGS Products have been especially made or adapted for use in an infringing manner, as evidenced by the '575 Patent's written description and the NGS Products' instructions for use.

ANSWER: Denies.

61. Each of Illumina's NGS Products constitutes or includes one or more material parts of the claimed inventions of the Ju Patents, and

is not a staple article or commodity of commerce suitable for substantial noninfringing use.

ANSWER: Denies.

62. Illumina's infringement of the '575 Patent has caused Plaintiffs damage.

ANSWER: Denies.

63. Upon information and belief, Illumina's infringement of the '575 Patent has been and will continue to be willful, justifying an award to Plaintiffs of increased damages under 35 U.S.C. § 284, and attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

ANSWER: Denies.

PRAYER FOR RELIEF

These paragraphs set forth the prayer for relief requested by Plaintiffs to which no response is required. Defendant denies that Plaintiffs are entitled to any of the requested relief and denies any allegations set forth in these paragraphs.

AFFIRMATIVE DEFENSES

1. Each of the claims for relief in the Complaint is barred, in whole or in part, because Illumina has not infringed and does not infringe any valid, enforceable claim of the '578, '698, '0869, '3869, and '575 Patents, either literally or by equivalents, under any theory, including direct infringement, infringement by inducement, or contributory infringement.

2. Upon information and belief, each of the claims for relief in the Complaint is barred, in whole or in part, because each of the asserted claims of the '578, '698, '0869, '3869, and '575 Patents is invalid for failure to comply with one or more provisions of Title 35 of the United States Code, including without limitation §§ 101, 102, 103, and/or 112.

3. Each of the claims for relief in the Complaint is barred, in whole or in part, under at least one of the doctrines of laches, estoppel, and/or waiver.

COUNTERCLAIM

Illumina Inc. hereby counterclaims against The Trustees of Columbia University in the City of New York ("Columbia University"), Intelligent Bio-Systems, Inc. ("IBS"), and Qiagen NV ("Qiagen") (collectively "Counterclaim Defendants") as follows:

PARTIES

1. Illumina, Inc. is a Delaware corporation with its principal place of business located at 5200 Research Place, San Diego, California 92122.

2. Illumina Cambridge Ltd. is a foreign corporation with its principal place of business located at Essex, United Kingdom CB10 1XL. Illumina Cambridge Ltd. is a wholly owned subsidiary of Illumina, Inc. (together "Illumina").

3. Columbia University is a non-profit educational corporation located at 535 West 116th Street, New York, New York 10027.

4. Upon information and belief, IBS is a Delaware corporation with its principal place of business located at 34 Bear Hill Road, Waltham, Massachusetts 02451.

5. Upon information and belief, Qiagen is a foreign corporation with its operative headquarters located in Hilden, Germany. Upon information and belief, Qiagen has acquired IBS and has obtained rights in the '578, '698, '0869, '3869, and '575 Patents. In press releases, Qiagen has stated that it is "moving into the next-generation sequencing market" and that it plans "to improve IBS's existing sequencing platform."

JURISDICTION AND VENUE

6. Illumina's counterclaims arise under the United States patent laws, 35 U.S.C. § 100 *et seq.*, and the Declaratory Judgment Act, 28 U.S.C. §§ 2201-2202.

7. The Court has subject matter jurisdiction over Illumina's counterclaims based on 28 U.S.C. §§ 1331 and 1338(a), (b).
8. Counterclaim Defendants are subject to personal jurisdiction in this State.
9. Venue is proper in this judicial district based on 28 U.S.C. §§ 1391 and 1400.

THE PATENTS IN SUIT

10. On June 6, 2006, United States Patent No. 7,057,026 (the "'026 Patent") was duly and properly issued to Colin Barnes, Shankar Balasubramanian, Harold Swerdlow, and John Milton for an invention entitled "Labelled Nucleotides." A copy of the '026 Patent is attached as Exhibit A.

11. Illumina is the owner by assignment of all right, title, and interest in and to the '026 Patent.

12. On August 31, 2010, United States Patent No. 7,785,796 (the "'796 Patent") was duly and properly issued to Shankar Balasubramanian, Colin Barnes, Xiaohai Liu, and John Milton for an invention entitled "Labelled Nucleotides." A copy of the '796 Patent is attached as Exhibit B.

13. Illumina is the owner by assignment of all right, title, and interest in and to the '796 Patent.

14. On April 17, 2012, United States Patent No. 8,158,346 (the "'346 Patent") was duly and properly issued to Shankar Balasubramanian, Colin Barnes, and Xiaohai Liu for an invention entitled "Labelled Nucleotides." A copy of the '346 Patent is attached as Exhibit C.

15. Illumina is the owner by assignment of all right, title, and interest in and to the '346 Patent.

16. The '026, '796, and '346 Patents will be collectively referred to as the "Labelled Nucleotides Patents."

IBS AND QIAGEN'S SEQUENCING PLATFORM

17. On information and belief, the MAX-Seq and MINI-20 sequencing platforms from IBS rely on sequencing by synthesis technology. In particular, upon information and belief, the MAX-Seq and MINI-20 sequencing platforms use IBS's sequencing by synthesis technology (the "IBS method").

18. IBS has represented that its technology is derived from work performed by Jingyue Ju. Specifically, IBS has stated that its technology is derived from the work described in Ju et al., "Four-Color DNA Sequencing by Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators," PNAS vol. 103, no. 52, pp. 19635-19640 (the "Ju Paper").

19. Upon information and belief, the IBS method is described on IBS's website and in the Ju Paper.

20. Upon information and belief, in the IBS method, the DNA is first broken into fragments, amplified, attached to a DNA sequence primer, and then affixed as a high-density array of spots onto a glass chip.

21. Upon information and belief, the IBS method works in a three-step process.

22. Upon information and belief, in the IBS method, the array of fragments is first subjected to reagents containing engineered DNA bases that include a removable fluorescent dye and an end cap.

23. Upon information and belief, in the IBS method these engineered DNA bases attach themselves to the end of the growing strand of DNA in accordance with the base on the complementary strand.

24. Upon information and belief, the capping group is separate from the label.

25. Upon information and belief, the fluorescent label is attached to the base by way of a cleavable linker.

26. Upon information and belief, the cleavable linker contains an allylic system.

27. Upon information and belief, the cleavable linker does not have a photo-cleavable group, nor does it contain a 2-nitrobenzyl group.

28. Upon information and belief, in the second step of the IBS method, the array is scanned by a high-resolution electronic camera and the fluorescent output of each of four dye colors at each array position is measured and recorded. Upon information and belief, the color indicates which base (A, C, G or T) was incorporated in the DNA fragment in the previous step.

29. Upon information and belief, in the third step of the IBS method, the capping group and the blocking group are removed in a cleaving reaction.

30. Upon information and belief, in the cleaving reaction the array is exposed to cleavage chemistry to break off the fluorescent dye and end cap that will allow additional bases to be added.

31. Upon information and belief, this cycle of extending, measuring, and cleaving is repeated multiple times.

32. Upon information and belief, at least some of the repetitions of the cycles after the first cycle involve incorporating a new engineered DNA base off of the extended bases rather than the sequencing primer.

33. Upon information and belief, extending off of the extended bases rather than the sequencing primer allows the method to obtain data related to the identity of a series of consecutive bases in multiple target fragments in parallel.

COUNT I

DECLARATORY JUDGMENT OF INVALIDITY

34. Illumina incorporates ¶¶ 1-33 of its Counterclaim here.

35. In its Amended Complaint, Columbia University has alleged that it "is the assignee of all right, title, and interest in and to" the '578, '698, '0869, '3869, and '575 Patents.

36. In its Amended Complaint, IBS has alleged that it "is the exclusive licensee of" the '578, '698, '0869, '3869, and '575 Patents.

37. Upon information and belief, Qiagen has acquired IBS and has obtained rights to the '578, '698, '0869, '3869, and '575 Patents.

38. An actual and justiciable controversy exists within the meaning of 28 U.S.C. §§ 2201 and 2202 between Illumina and Counterclaim Defendants with respect to the validity of the '578, '698, '0869, '3869, and '575 Patents.

39. Upon information and belief, the '578, '698, '0869, '3869, and '575 Patents are invalid because they fail to satisfy the conditions for patentability set forth in the Patent Act, 35 U.S.C. §§ 100, *et seq.*, including but not limited to §§ 101, 102, 103, and 112.

COUNT II

DECLARATORY JUDGMENT OF NON-INFRINGEMENT

40. Illumina incorporates ¶¶ 1-39 of its Counterclaim here.
41. An actual and justiciable controversy exists within the meaning of 28 U.S.C. §§ 2201 and 2202 between Illumina and Counterclaim Defendants with respect to infringement of the '578, '698, '0869, '3869, and '575 Patents.
42. Illumina has not infringed any valid, enforceable claim of the '578, '698, '0869, '3869, and '575 Patents, either literally, or by equivalence, or under any theory, including direct infringement, infringement by inducement, or contributory infringement.

COUNT III

INFRINGEMENT OF U.S. PATENT NO. 7,057,026 AGAINST IBS AND QIAGEN

43. Illumina incorporates ¶¶ 1-42 of its Counterclaim here.
44. IBS and Qiagen have infringed, are infringing and/or will infringe, literally or by equivalence, one or more claims of the '026 Patent by making, using, offering to sell, or selling their MAX-Seq and MINI-20 DNA Sequencers.
45. Upon information and belief, users of IBS and Qiagen's MAX-Seq and MINI-20 DNA Sequencers, including but not limited to IBS and Qiagen's customers, have infringed, are infringing, or will infringe, literally or by equivalence, one or more claims of the '026 Patent by using those products to perform DNA sequencing.
46. Upon information and belief, IBS and Qiagen have actively induced, are actively inducing, or will actively induce infringement, literally or by equivalence, of one or more claims of the '026 Patent, by offering to sell and selling its MAX-Seq and MINI-20 DNA Sequencers and providing use instructions to users, including but not limited to

IBS and Qiagen's customers, intending that those users use the MAX-Seq and MINI-20 DNA Sequencers in a manner that infringes one or more claims of the '026 Patent.

47. Upon information and belief , IBS and Qiagen have contributed to, are contributing to, or will contribute to infringement, literally or by equivalence, of one or more claims of the '026 Patent, by offering to sell and selling its MAX-Seq and MINI-20 DNA Sequencers and providing use instructions to users, including but not limited to IBS and Qiagen's customers, knowing that its MAX-Seq and MINI-20 DNA Sequencers have been especially made or adapted for use in an infringing manner, as evidenced by the '026 Patent's written description and the MAX-Seq and MINI-20 DNA Sequencers' instructions for use.

48. Each of IBS and Qiagen's MAX-Seq and MINI-20 DNA Sequencers constitutes or includes one or more material parts of the claimed inventions of the Labelled Nucleotides Patents, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

49. The acts of IBS and Qiagen complained of herein constitute direct and indirect infringement of the '026 Patent in violation of 35 U.S.C. § 271.

50. IBS and Qiagen's infringement of the '026 Patent has caused Illumina damages.

COUNT IV

INFRINGEMENT OF U.S. PATENT NO. 7,785,796 AGAINST IBS AND QIAGEN

51. Illumina incorporates ¶¶ 1-50 of its Counterclaim here.

52. IBS and Qiagen have infringed, are infringing and/or will infringe, literally or by equivalence, one or more claims of the '796 Patent by making, using, offering to sell, or selling their MAX-Seq and MINI-20 DNA Sequencers.

53. Upon information and belief, users of IBS and Qiagen's MAX-Seq and MINI-20 DNA Sequencers, including but not limited to IBS and Qiagen's customers, have infringed, are infringing, or will infringe, literally or by equivalence, one or more claims of the '796 Patent by using those products to perform DNA sequencing.

54. Upon information and belief, IBS and Qiagen have actively induced, are actively inducing, or will actively induce infringement, literally or by equivalence, of one or more claims of the '796 Patent, by offering to sell and selling its MAX-Seq and MINI-20 DNA Sequencers and providing use instructions to users, including but not limited to IBS and Qiagen's customers, intending that those users use the MAX-Seq and MINI-20 DNA Sequencers in a manner that infringes one or more claims of the '796 Patent.

55. Upon information and belief, IBS and Qiagen have contributed to, are contributing to, or will contribute to infringement, literally or by equivalence, of one or more claims of the '796 Patent, by offering to sell and selling its MAX-Seq and MINI-20 DNA Sequencers and providing use instructions to users, including but not limited to IBS and Qiagen's customers, knowing that its MAX-Seq and MINI-20 DNA Sequencers have been especially made or adapted for use in an infringing manner, as evidenced by the '796 Patent's written description and the MAX-Seq and MINI-20 DNA Sequencers' instructions for use.

56. Each of IBS and Qiagen's MAX-Seq and MINI-20 DNA Sequencers constitutes or includes one or more material parts of the claimed inventions of the Labelled Nucleotides Patents, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

57. The acts of IBS and Qiagen complained of herein constitute direct and indirect infringement of the '796 Patent in violation of 35 U.S.C. § 271.

58. IBS and Qiagen's infringement of the '796 Patent has caused Illumina damages.

COUNT V

INFRINGEMENT OF U.S. PATENT NO. 8,158,346 AGAINST IBS AND QIAGEN

59. Illumina incorporates ¶¶ 1-58 of its Counterclaim here.

60. IBS and Qiagen have infringed, are infringing and/or will infringe, literally or by equivalence, one or more claims of the '346 Patent by making, using, offering to sell, or selling their MAX-Seq and MINI-20 DNA Sequencers.

61. Upon information and belief, users of IBS and Qiagen's MAX-Seq and MINI-20 DNA Sequencers, including but not limited to IBS and Qiagen's customers, have infringed, are infringing, or will infringe, literally or by equivalence, one or more claims of the '346 Patent by using those products to perform DNA sequencing.

62. Upon information and belief, IBS and Qiagen have actively induced, are actively inducing, or will actively induce infringement, literally or by equivalence, of one or more claims of the '346 Patent, by offering to sell and selling its MAX-Seq and MINI-20 DNA Sequencers and providing use instructions to users, including but not limited to IBS and Qiagen's customers, intending that those users use the MAX-Seq and MINI-20 DNA Sequencers in a manner that infringes one or more claims of the '346 Patent.

63. Upon information and belief, IBS and Qiagen have contributed to, are contributing to, or will contribute to infringement, literally or by equivalence, of one or more claims of the '346 Patent, by offering to sell and selling its MAX-Seq and MINI-20 DNA Sequencers and providing use instructions to users, including but not limited to IBS and Qiagen's customers, knowing that its MAX-Seq and MINI-20 DNA Sequencers have been especially made or adapted for use in an infringing manner, as evidenced by the

'346 Patent's written description and the MAX-Seq and MINI-20 DNA Sequencers' instructions for use.

64. Each of IBS and Qiagen's MAX-Seq and MINI-20 DNA Sequencers constitutes or includes one or more material parts of the claimed inventions of the Labelled Nucleotides Patents, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

65. The acts of IBS and Qiagen complained of herein constitute direct and indirect infringement of the '346 Patent in violation of 35 U.S.C. § 271.

66. IBS and Qiagen's infringement of the '346 Patent has caused Illumina damages.

PRAYER FOR RELIEF

WHEREFORE, Illumina prays that this Court enter judgment in its favor against Counterclaim Defendants as follows:

A. Dismissing the Amended Complaint with prejudice, and denying all relief sought in the Amended Complaint;

B. Finding that the claims of the '578, '698, '0869, '3869, and '575 Patents are invalid;

C. Finding that Illumina has not and does not infringe any valid, enforceable claim in the '578, '698, '0869, '3869, and '575 Patents;

D. Finding that IBS and Qiagen have directly infringed, are directly infringing, or will directly infringe one or more claims of the '026, '796, and '346 Patents;

E. Finding that IBS and Qiagen have actively induced, are actively inducing, or will actively induce infringement of one or more claims of the '026, '796, and '346 Patents by users of their MAX-Seq and MINI-20 DNA Sequencers;

F. Finding that IBS and Qiagen have contributed to, are contributing to, or will contribute to infringement of one or more claims of the '026, '796, and '346 Patents by users of their MAX-Seq and MINI-20 DNA Sequencers;

G. Finding that IBS and Qiagen's infringement of one or more of the claims of the '026, '796, and '346 Patents was or is willful and deliberate;

H. Awarding Illumina damages for IBS and Qiagen's infringement of one or more of the claims of the '026, '796, and '346 Patents, in an amount no less than the cost of a reasonable royalty for such infringement, together with interests and costs;

I. Awarding Illumina increased damages under 35 U.S.C. § 284.

J. Enjoining IBS and Qiagen, preliminarily and permanently, from engaging in the making, using, offering to sell, or selling within the United States, or importation into the United States, of its infringing products and/or services, under 35 U.S.C. § 283.

K. Finding that this is an exceptional case under 35 U.S.C. § 285 and ordering Counterclaim Defendants to reimburse Illumina for its attorneys' fees and costs incurred in this action; and

L. Granting Illumina further relief as this Court deems just and reasonable.

ASHBY & GEDDES

/s/ Lauren E. Maguire

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